



ECONOMICS & BUSINESS SPOTLIGHT

Fall 2003

Division Director's Message



The field of mineral economics is distinctly international—and increasingly so. Mineral markets that were once regional or national in scope have become more international, as reduced costs of long-distance transport facilitated development of mines at greater distances from processing facilities and consumers. The collapse of the Soviet Union and the embrace of market economics in many parts of South America, Asia, and Africa encouraged mineral investment over the last decade or so in areas not previously receptive to private investment, at least in our lifetimes.

In this light, our graduate program in mineral economics has become

more and more international. Greater than half of our students come from outside the United States. Our joint-degree program in petroleum economics and management with the Institut Français du Pétrole (IFP) permits students to spend two semesters at CSM and two academic terms at the IFP in France. Most of our faculty members are active internationally. For the last several years, I have been a visiting professor for 1-2 weeks each year in the mineral economics programs at the Curtin University of Technology in Western Australia and at the University of Chile. As described later in this newsletter, Luis Sosa and I participated in a workshop on market access in the Dominican Republic, as part of the annual Conference of the Mining Ministries of the Americas. Alexandra Newman worked on a production-scheduling model for the Kiruna Mine in northern Sweden. Jim Otto delivered a keynote

address at a mining conference in Lima, Peru. Carol Dahl attended the annual conference of the International Association of Energy Economics in Prague. Graduate student Charles Douglas-Hamilton worked as an intern for the International Energy Agency in Paris. John Tilton is in Chile in 2003, helping the Catholic University start up a graduate program in mineral economics.

Closer to home, the fall semester is off to a great start for all our students—in Economics, Engineering and Technology Management, and Mineral Economics. We welcome Cigdem Gurgur to the faculty.

Please enjoy this newsletter. As always, keep in touch!

Rod Eggert
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Division Facts at a Glance.....

Undergraduate Majors	100
Undergraduate Minors	137
Engineering & Technology	
Management M.S. Students	54
Mineral Economics M.S. Students	36
(Includes Petroleum Economics & Management [13])	
Mineral Economics Ph.D. Students	21

Inside This Issue.....

ETM Executive in Residence	2
Product Innovation Tradeshow	2
Market Access	3
Undergrad Enrollments Rise	3
Engineers Without Borders	3
Coulter Foundation	4
EB Thanks Its Supporters	4
New ETM Faculty	4
Student/Alumni News	5
Faculty News	6
Congratulations 2002-2003 Grads	7
Recognition of Excellence	7

ETM Initiates “Executive-in-Residence” Series

The Engineering and Technology Management (ETM) Program is pleased to announce the launch of its Executive-in-Residence Series for Fall 2003. This program will allow industry leaders to actively participate in the ETM graduate program by giving lectures, advising students, interacting with the ETM faculty, and offering suggestions for program improvements.

Dr. Richard Herring is this semester’s executive in residence. He served as former Senior Vice President of Strategic Management

at Ball Aerospace and Technology Company. He has served as Chief Operating Officer of Ball as well as President of the Aerospace Division. Dr. Herring is Executive Director of Engineers Without Borders-USA. He holds a B.S. degree from Lehigh University and M.S. and Ph.D. degrees from the University of Colorado.

Dr. Herring’s seminar series will emphasize executive leadership. He will also present his thoughts and experiences related to the commercialization of technology.



Dr. Richard Herring

Product Innovation Tradeshow

Eight students from David Moore’s New Product Development class (EBGN 564) developed two new products, from concept generation through prototype development and testing. Students integrated multiple engineering and business perspectives as they managed their design projects.

The two design teams presented their final prototypes to members of the CSM community in a trade show held in Engineering Hall.



Team Pet Door demonstrating the automatic pet door.



Berig, Sharkey, Gale, and Sarnow of Team Emprise Sports explain how their ski jib tool works.

Team Pet Door’s two automatic pet doors were designed to allow cats and dogs to enter and exit while at the same time sealing out weather and preventing access by unwelcome visitors. The group even brought a dog to demonstrate the door!

Team Emprise Sports developed a jib tool which allows freestyle skiers to ride the rails without damage to their skis. The team claims that the jib tool will “change the face of freestyle skiing forever.” A live video showed the jib tool in action.

Dr. Richard Herring EIR Seminar Series Fall 2003

- Intrapreneur/Entrepreneur
September 2
- General Management/Legal
Issues
September 16
- Business and Strategic Plan-
ning
September 30
- Managing Change
October 21
- Managing R&D/Intellectual
Property Issues
November 4
- Marketing and Sales
November 18
- HR—A Management Tool
December 2

All seminars held Tuesday
4:00—5:30 pm
Hill Hall, Room 202

Market Access

Professors Rod Eggert and Luis Sosa, along with graduate student **Claudio Valencia**, worked earlier this year on a cooperative research agreement between the Division and the Chilean Copper Commission, an agency of the Chilean government. The government of Chile is convinced that competitiveness of Chilean products in international markets is crucial for long-term sustainable mining. With this in mind, the Copper Commission developed a cooperative research network with institutions in Brazil, Canada, Mexico, and the United States—all important producers of minerals and metals. The objective of the network was to exchange information about rules and regulations affecting international trade in minerals and metals, especially non-tariff barriers to trade. Colorado School of Mines, through the Division, participated in the network from the United States.

Eggert, Sosa, and Valencia presented preliminary results of their work at a workshop organized as part of the annual meeting of the Association of Mining Ministries of the Americas in Santo Domingo, Dominican Republic, March 3-4, 2003.



Want to learn more about the Division of Economics and Business? Visit <http://www.mines.edu/academic/econbus/>.

Undergrad Enrollments Rise

For fall 2003, more than 100 students have chosen Economics as their major. Traditionally, the Division has attracted students who entered Mines with the intention of pursuing an engineering degree. This year, ten percent of our majors entered CSM with the intention of majoring in economics. This trend indicates the increasing recognition of the quality of the degree in the broader CSM community.



Undergrads listen to a presentation given by Luis Sosa (not shown) during the Economics and Business Open House.

This year began the roll-out of a more structured undergraduate degree program in economics. Majors will be able to take additional courses, including a

new course, Personal Finance, which will be offered each summer. We have been able to increase the diversity of our course offerings in spite of the budget constraints currently affecting Mines curricula.

In other news from the past year, recent economics major **Peter McCarty** represented CSM at the Business Today International Conference in New York City, November 23-26, 2002. McCarty was awarded an all-expenses paid trip by its host, Princeton University. He was chosen to attend from a select group of students from the U.S. and around the world. "The Business Today International Conference in New York was a memorable experience I won't soon forget," said Peter. "The guest speakers were very interesting and the accommodations were first-class." In addition to interacting with many of the speakers, he spent time with students from prestigious universities around the world. "The opportunity to discuss important business issues with such a fine group of individuals doesn't come along every day," explained Peter.

Engineers Without Borders-USA

Engineers Without Borders–USA (EWB-USA) is a national organization whose mission is to help disadvantaged communities throughout the world improve their quality of life. The newly founded CSM chapter began work on its first project last fall. ETM students **Katie Brown** and **Mike Sharkey** developed plans for a new village in northern Thailand to house nomadic hill-dwelling tribes. **Nate Hamm** and **John Herring** were responsible for the engineering and project plans for a new health clinic. The four students traveled to northern Thailand to conduct planning activities during Spring Break in March 2003.

During summer 2003, eight additional students from the Economic and Business Division, along with more than 50 students from other U.S. schools, were involved in EWB-USA projects in Mali, Mauritania, Senegal, Thailand, Haiti, Belize, Nicaragua, Afghanistan, Nepal, and Peru. The projects are conducted by students under the supervision of faculty and professional engineers from partnering engineering firms. Projects involve the design and construction of water, waste-water, sanitation, energy, and shelter systems.

Coulter Foundation

Last May, the trustees of the Viola Vestal Coulter Foundation held their annual meetings on the CSM campus. The Coulter Foundation was instrumental in the founding of the mineral economics program at CSM, making its first gift to CSM in 1968 to establish the William Jesse Coulter Chair in Mineral Economics, now held by John Tilton. Since then, the Foundation has provided annual support to the Division, continuing to fund the Coulter Chair while also supporting two instructorships, annual awards to the outstanding graduating mineral economics and economics students, and professional-development activities of faculty members in the Division. The Coulter Foundation has been quite generous to CSM more generally, with gifts to support graduate scholarships and the Mabel M. Coulter Student Health Center on campus.

William Jesse Coulter was a mining engineer who worked in New Mexico, Alaska, and Colorado in the first half of the 20th Century. Much of his experience was with the Climax Molybdenum Company, where he served as General Superintendent, General Manager of Western Operations, and Vice President of Mining Operations. He established the Foundation in the late 1930s for the purpose of helping students receive a university education. He named the Foundation after—and to honor—his deceased wife, Viola Vestal Coulter.

We thank the Coulter Foundation for its support over the years and look forward to welcoming it to campus again soon!

Welcome, new ETM faculty Dr. Cigdem Z. Gurgur



Dr. Cigdem Gurgur joined us as an Assistant Professor in Fall 2003. Dr. Gurgur comes to CSM from the University of Toledo, where she was Assistant Professor of Mechanical, Industrial, and Manufacturing Engineering.

Dr. Gurgur obtained a B.S. degree in Industrial Engineering from METU in Turkey. She holds two M.S. degrees: Applied and Mathematical Statistics from Rutgers University and Management Science and Operations Research from the University of Warwick in England. Dr. Gurgur's Ph.D. degree in Industrial and Systems Engineering is from Rutgers University.

EB Thanks Its Supporters

Your Gift is Important to Our Success!

The EB Division sincerely thanks the many supporters who made contributions directly to the Division. Thanks to the generosity of our supporters, the Division has been able to maintain the level of excellence and opportunities for our students.

Below is a list of our recent contributors:

Jerome and Rebecca Broussard
Joseph E. Casabona
Lester L. Crum
Dana J. Fowers

Veronica E. Garrido
Bruce M. Genereaux
John H. Hill
Laura R. Hill
Bradley J. Horn
Ruthann C. Moomy
A. Scott Moore
Donald B. Ratcliff
David S. Schramm
Leonard B. Smith
David H. Waters III
Linda Good Wilson

Osilas Foundation
Shell People Services
Viola Vestal Coulter Foundation

Special thanks to an anonymous donor who generously contributed to our financial aid fund for graduate students.

In addition, several faculty members made financial contributions.



Student News



MinEc student **Charles Douglas-Hamilton** spent summer 2003 as an intern for the International Energy Agency. Charles said that he chose to do a summer internship instead of summer research for a thesis option because the experience would expose him to the workplace. The experience gave him insight into key issues in public policy and how the issues relate to economic development in the energy sectors in developing countries such as Africa.



ETM student **Katie Brown** has accepted a position with the National Renewable Energy Laboratory in Golden, CO. After working as an intern at NREL, Katie accepted a full-time position as a project leader in the Photovoltaic Manufacturing R&D division. Katie is excited about the opportunity to begin applying her recently learned ETM skills. She will complete her M.S. ETM in December 2003.



MinEc student **Sara Russell** spent the summer working as an analyst for the U.S. Minerals Management Service with the Department of the Interior. Her work involved maximizing royalty revenues from federal and Indian lands.

Alumni Corner

Brian Johnson (M.S. MinEc '88) is Director of Energy & Utilities—Asia Pacific for PriceWaterhouse-Coopers. He says that “almost every aspect of my education at Mines comes into play at varying times.” He still uses some of the textbooks and reference materials. He recently hired another CSM student, **Chris Buchan** (M.S. MinEc '99). **James Hesketh** (M.S. MinEc '87) is Vice President & Principle Mining Engineer for NM Rothschilds & Sons in Denver, CO. **William Pincus** (M.S. MinEc '86) was Vice President of Operations for Sunshine Mining. He supervised the development of the Pirquitas silver project in northern Argentina. **Ronald Cattany** (M.S. MinEc '77) has been appointed Director of the Colorado Division of Minerals and Geology (DMG). He has served as Deputy Director of the Department of Natural Resources since 1991. The DMG includes the mined-land reclamation program,

the coal-regulatory program, the abandoned-mines program, and the Colorado Geological Survey. **Clint Johnson** (M.S. MinEc '01) is Sr. Financial Analyst at Vectra Bank Colorado. His research interests are portfolio optimization, efficiency models, and data development analysis. **David Loring** (M.S. ETM '02) has accepted a position with Mine Ventilation Services in Fresno, CA. His new title is Ventilation Engineer. Most recently, he spent 10 days on a study of the Red Lake Mine, a 5,500-foot deep gold mine in northern Ontario, Canada. **Raul Doering** (M.S. MinEc '01) still misses his life as a student at CSM. Although he says that being Secretary of Mining of Catamarca, Argentina, keeps him very busy. **Mike Gathers** (M.S. ETM '02) accepted a position with Westport Resources as a Corporate Planning Engineer. He is working out of the Denver, CO office. **Gonzalo Gar-**

cia-Huidobro (M.S. MinEc '85) has worked with Dow Chemical in Chile and the U.S. He has also worked in copper production with Chilean companies and in sales for a mineral commodity. **Peter Howie** (Ph.D. MinEc '02) and **Zauresh Atakhanova** (Ph.D. MinEc '02) have accepted teaching positions at the Kazakhstan Institute of Management in the Economics and Strategic Research Department in Kazakhstan. **Joe Mazumdar** (M.S. MinEc '03) is Sr. Market Analyst with Phelps Dodge based in Phoenix, AZ. **Maria Chappuis** (M.S. MinEc '82) is the new Director of Mines in Peru.

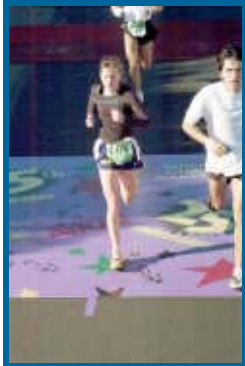
Alumni, we would like to hear from you. What are you doing? For whom do you work? In what country do you live? Send an email with your news to csanford@mines.edu.

Faculty News

Irina Khindanova's paper "Stable Modeling of Market and Credit Value-at-Risk," co-authored with S. Rachev and E. Schwartz, appeared in the *Handbook of Heavy-Tailed Distributions in Finance* (Elsevier Science, 2003). Her paper "GARCH-type Process in Modeling Energy Prices," with Z. Atakhanova (Ph.D. MinEc '02) and S. Rachev is forthcoming.



Alexandra Newman is working with Dr. Topal (CSM Mining Engineering Ph.D.) and Dr. Kuchta (CSM Mining Department Associate Professor) on a production scheduling model for LKAB's Kiruna Mine. This Swedish mine, located above the Arctic circle, is the second largest underground mine in the world, producing over 20 million tons of iron ore yearly and employing nearly 3000 workers. Complex production schedules determine the sequence in which ore and waste blocks should be extracted.



Using optimization (integer programming), the trio can expedite run times of models such that a solution can be found in a matter of hours, not days. These co-authors presented their work at the Society for Mining, Metallurgy, and Exploration, Inc., in Cincinnati, OH, and at the Conference on Application of Computers and Operations Research in the Mining Industry in Cape-town, South Africa. Their work has resulted in the publication of three refereed articles: "Production Scheduling at LKAB's Kiruna Mine Using Mixed

Integer Programming" (*Mining Engineering*), "Extensions to an Efficient Optimization Model for Long-Term Production Planning at LKAB's Kiruna Mine" (*Applications of Computers and Operations Research in Minerals Industries*, South African Institute of Mining and Metallurgy), and "Implementing a Production Schedule at LKAB's Kiruna Mine" (*Interfaces*). Work this summer included finishing several research papers detailing their solution methodologies.

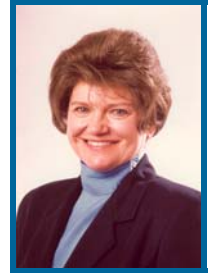
Luis Sosa was inducted as an honorary member into Phi Beta Delta Epsilon Mu Chapter at its Spring meeting. The organization recognizes the international academic interests and achievement of the founding members, faculty advisors, and honored guests.



James Otto was invited to deliver the keynote address at the Mining Development Conference in Latin America held in Lima, Peru. Co-hosted by the International Bar Association and the Rocky Mountain Mineral Law Foundation, this conference, which is held every two years, is the largest and most prestigious of its type in Latin America. It draws senior management and government officials from around the world. Jim Otto's talk was on current legal and investment trends around the globe.



Carol Dahl chaired a session on Recent Advances in Energy Economics at the 5th Annual International Association for Energy Economics/Allied Social Science Association in Washington, DC January 2003. She attended the International Association for Energy Economics meeting in Prague in June 2003 and was an opponent for a Ph.D. dissertation at the University of Gothenberg in Sweden. Dahl's new book, *Energy Economics and International Energy Market* (Penwell Press) should be published in December 2003 or January 2004. She also co-authored a paper with Sami Kamel (Ph.D. MinEc '02) on hybrid power systems in Egypt.



Graham Davis has an ongoing relationship with the U.S. Department of Energy. Dr. Davis is helping the Office of Fossil Energy assess the existing and potential benefits of their fossil energy R&D programs. Part of the analysis includes providing real options training to the scientists at DOE. Dr. Davis has just completed a similar exercise for the NREL Laboratory in Golden, CO. He wrote the NREL technical report "Optimizing the Level of Renewable Electric R&D Expenditures Using Real Options Analysis," available at <http://www.nrel.gov/publications>.



Congratulations 2002-2003 Graduates

Ph.D., Mineral Economics

Zauresh Atakhanova
Paul L. Ewing, Jr.
Peter A. Howie

M.S., Mineral Economics

Nasser A. Al-Dossary
Mansoor H. Al-Harthy
Ayed Al-Qahtani
Javier O. Alveres
Clement J. Berthiau
Sylvester Carmichael
Dolly A. Craig
Kevin M. DeGeorge
Daniel J. DeSnyder
Paul L. Ewing, Jr.
Benjamin W. Garrard
James S. Golden
Benny Hasan
James D. Heskin
David Hilburg
Andrew A. Irvine
Casey J. Kaptur
Catherine M. Keske-Handley
Mathieu C. Le Renard
Guijun Li
Jose Martinez-Val
Joe Mazumdar
Remco Meeuwis
Olivier M. Pernet
John K. Reinsma
Maria D. Salvitti
Maria R. Sanchez
Erkan Topal
Claudio Valencia

M.S., Engineering and Technology Management

Edward J. Alcock
Elizabeth A. Anselmo

Tanya K. Barb
Adam L. Berig
Jerome D. Bourgeois
Jeffrey J. Chan
Efrain Davila
Brandon L. Desh
Javier Diaz
Sean M. Donlin
Ann Dozoretz
Juliana F. Drummond
Audrey R. Dunbar
Jennifer L. Ehler
Braeden Ellis
Mayumi Fukushima
Adriano V. Garcia
Michael Gathers
Thomas Grimaldi
Nathaniel P. Hamm
John S. Herring
April M. Hillman
Nathan D. Jones
Douglas A. Klein
Kimberly M. Lewis
David M. Loring
William T. Parker
Charles B. Place IV
Michael Rasmussen
Mark A. Ruthven
Jesus J. Salazar
Robert C. Sawaya
Michael Sharkey
David Vivanco

B.S., Economics

Waleed Al-Otaibi
Adedotun A. Ayanbule
Brandon J. Baker
Adetayo S. Balogun
Ryan T. Brothers
Earl Y. Choi

Eli A. Deutscher
Andrea M. Giersdorf
Larry E. Hartman, Jr.
James D. Heskin
David R. Howerton
David A. Kewley
Zane A. Kuenzler
Jon M. Martinez
Peter M. McCarty
Jentry P. Mitchell
Brian S. O'Connor
Kisung Park
Harald Reinertsen
Robert G. Rodriguez
Taylor T. Shively
Joseph V. Sikorski
Edward T. Smith
Kristie L. Smith
Brad E. Sutton
Jared R. Thompson
Angela I. Vannucci
Gustavo E. Villagrana
David M. Warner
Michael R. Webb



Recognition of Excellence

For the second year, **Luis Sosa** swept the Excellence in Teaching awards. These teaching awards are voted on by the students in each EB degree program. During the post-graduation celebration, Sosa received Excellence in Teaching awards for economics, mineral economics, and ETM.

John Stermole was voted the Economics and Business Division's Outstanding Faculty member. The recipient of this award is selected by CSM graduating seniors.

Student awards were presented to **Zauresh Atakhanova** (William Jesse Coulter Award in Economics)

and **Maria Sanchez** (Hubert and Sarah Riser Award in Mineral Economics). **Charles Place IV** and **Michael Rasmussen** tied for the Broussard Award for ETM. The Outstanding Senior Award went to **Brian O'Connor**.

**For more than thirty years...
the Division of Economics and Business at the Colorado School of Mines has
prepared students to become leaders in industry and government. Today, the
tradition remains stronger than ever.**



**For more information, contact
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